

# BREMERTON GAS WORKS SUPERFUND SITE STATUS UPDATE

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March 22, 2018

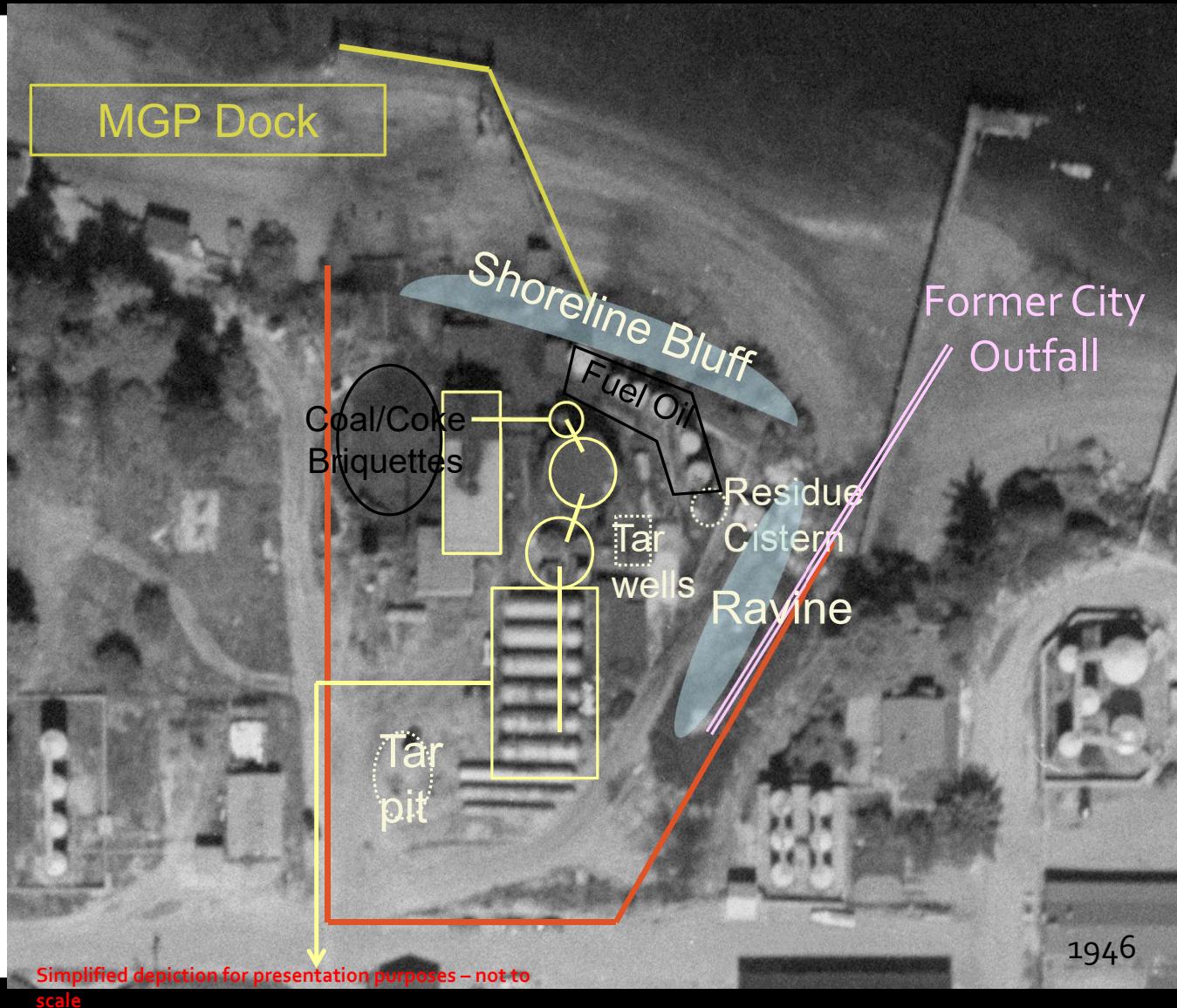


# Bremerton Gas Works

1952/53

MGP operational area ~1 acre





## Current Conditions and Historical Features



# Previous Investigations

- 1995 – Ecology Field Inspection, Sesko Property
  - Analysis of three surface soil and one surface sediment sample
- 2007 – Preliminary Upland Assessment
  - 8 borings completed as monitoring wells
  - Analysis of soil and groundwater samples
- 2008 – Targeted Brownfield Assessment
  - 7 borings, 2 completed as monitoring wells
  - Analysis of soil, surface sediment and groundwater samples

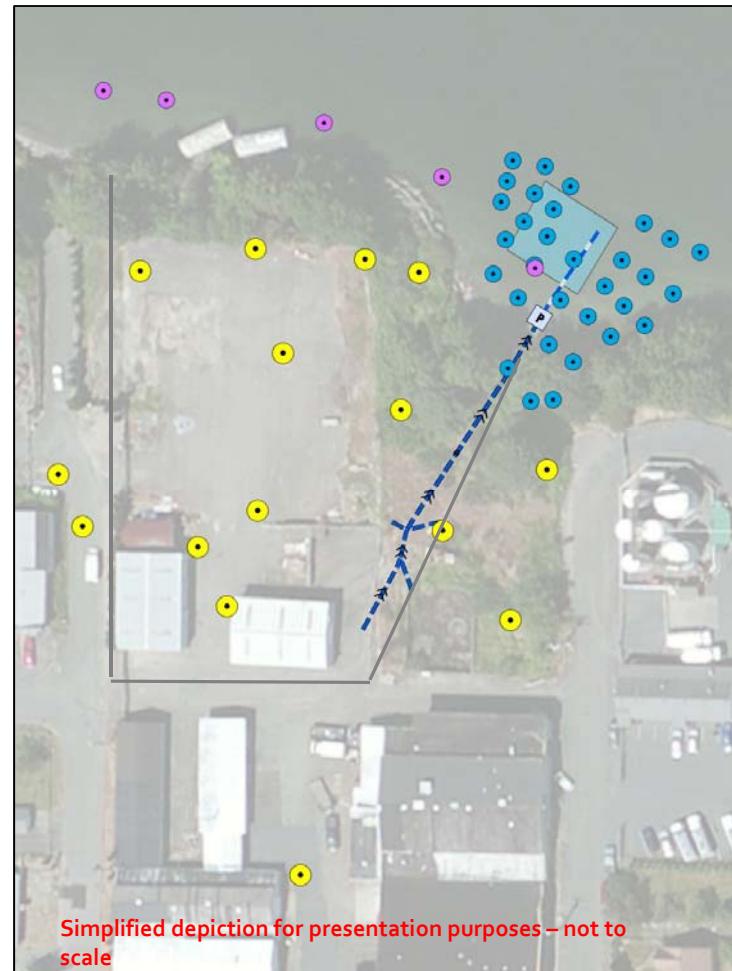


# Time Critical Removal Action (2010 TRCA)

## Actions Taken

- Former Drainage Line cut and plugged
- Mat placement

- Soil and Groundwater Explorations
- Ecology and Environment (2009)
- Ecology and Environment (2010)



2010 TCRA

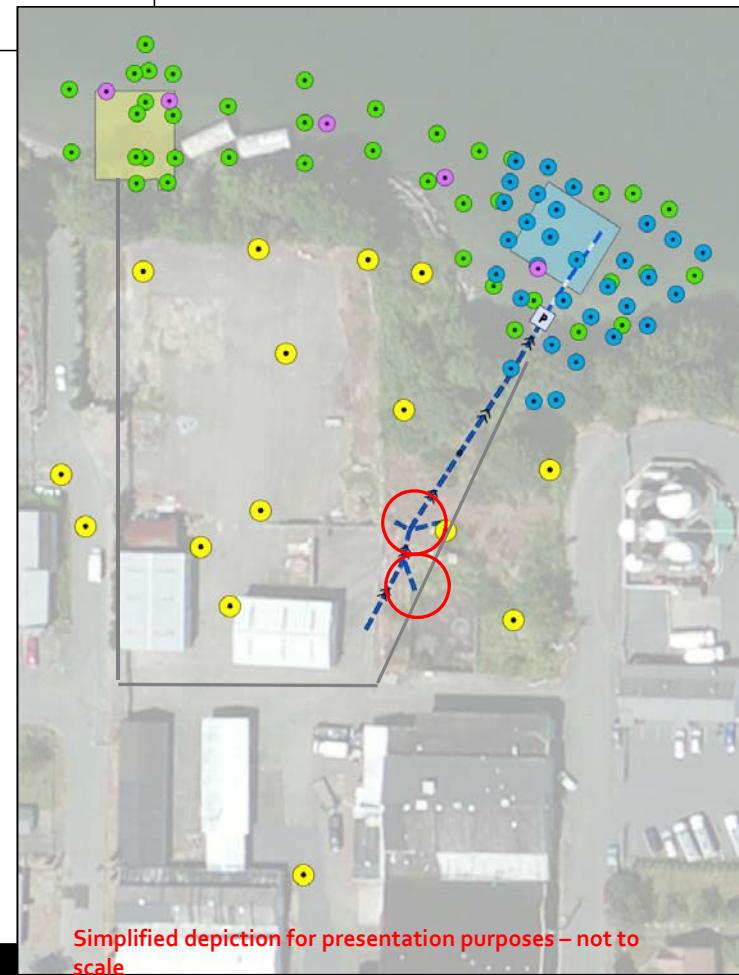


# 2013 Time Critical Removal Action (2013 TCRA)

## Actions Taken

- Placing 2<sup>nd</sup> mat
- Capping of Manhole A
- Plugging the drain

- Yellow circle: Soil and Groundwater Explorations
- Purple circle: Ecology and Environment (2009)
- Blue circle: Ecology and Environment (2010)
- Green circle: Anchor QEA (2013)



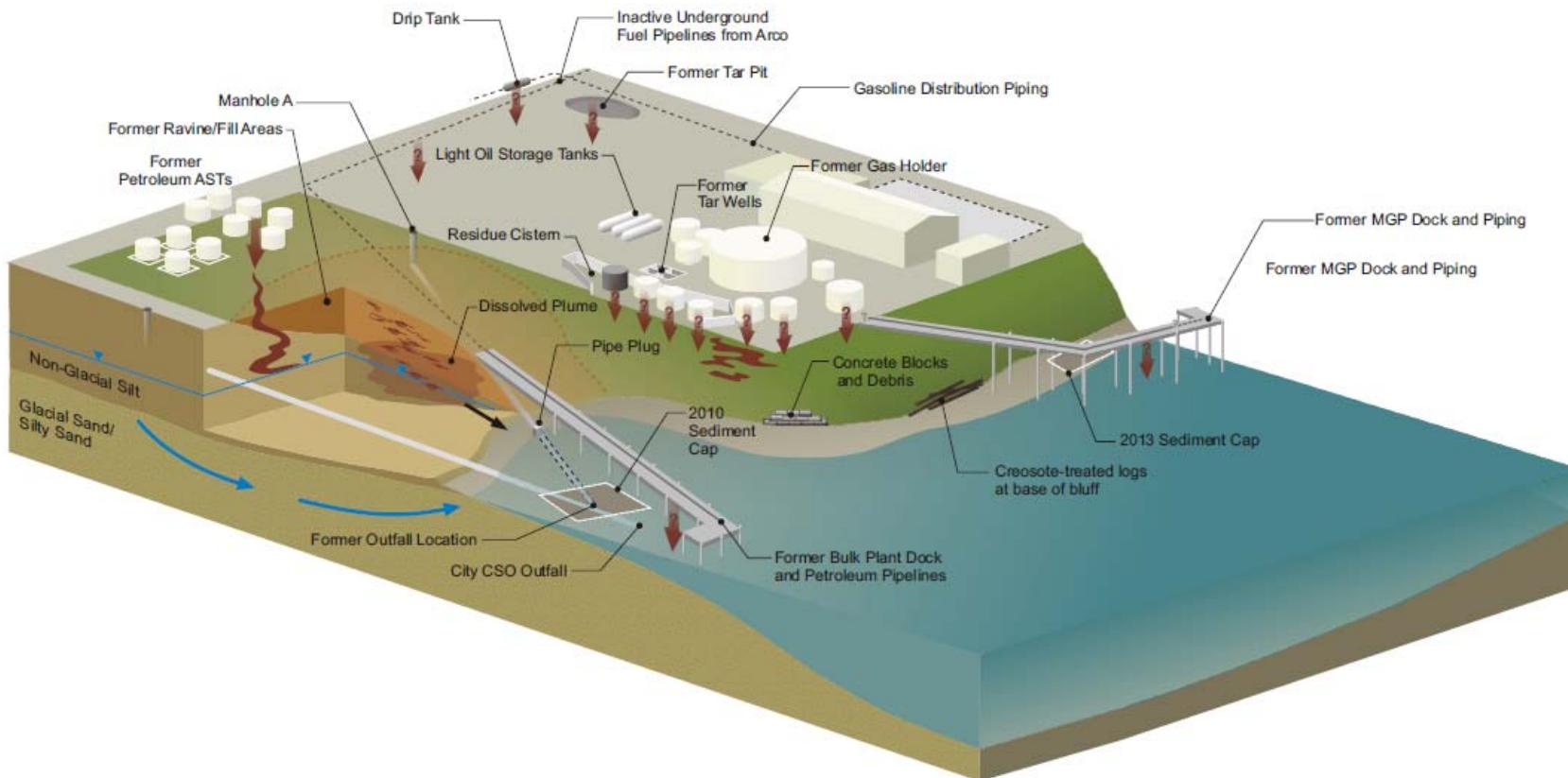
2013 TCRA



# 2013 TCRA

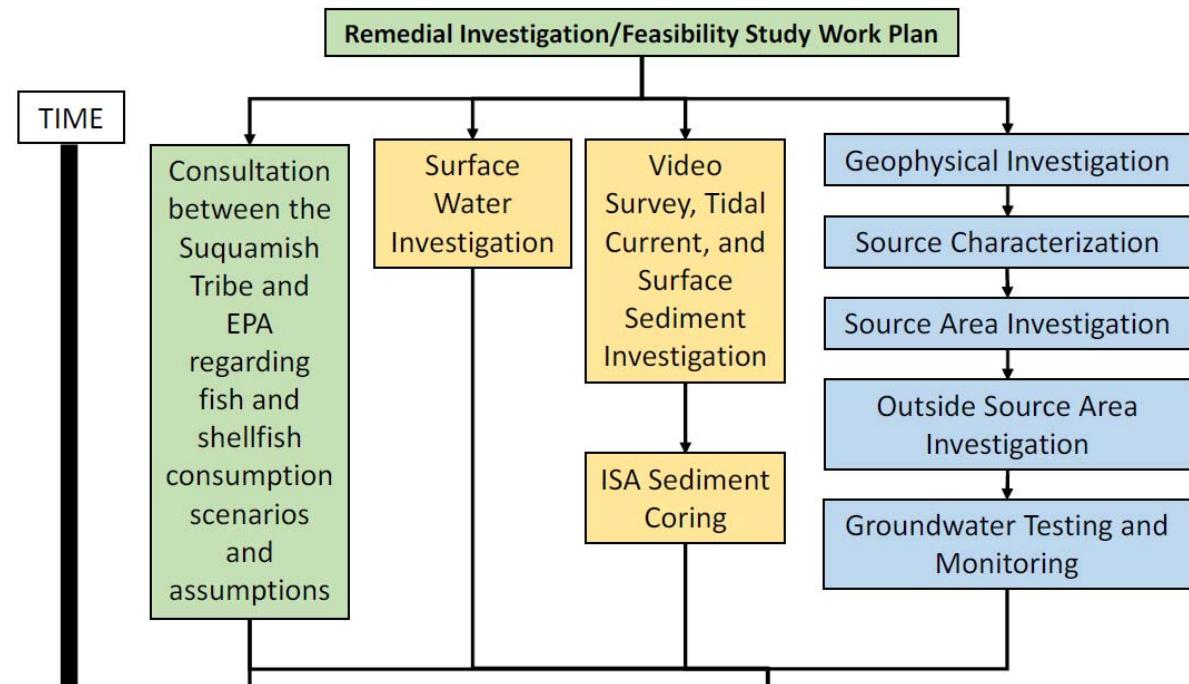


# Preliminary Conceptual Site Model



# RI-FS Work Plan

- The RI/FS Work Plan was approved in May 2017
- Field work commenced in summer 2017 and is ongoing
- Initial data assessment and evaluations are underway



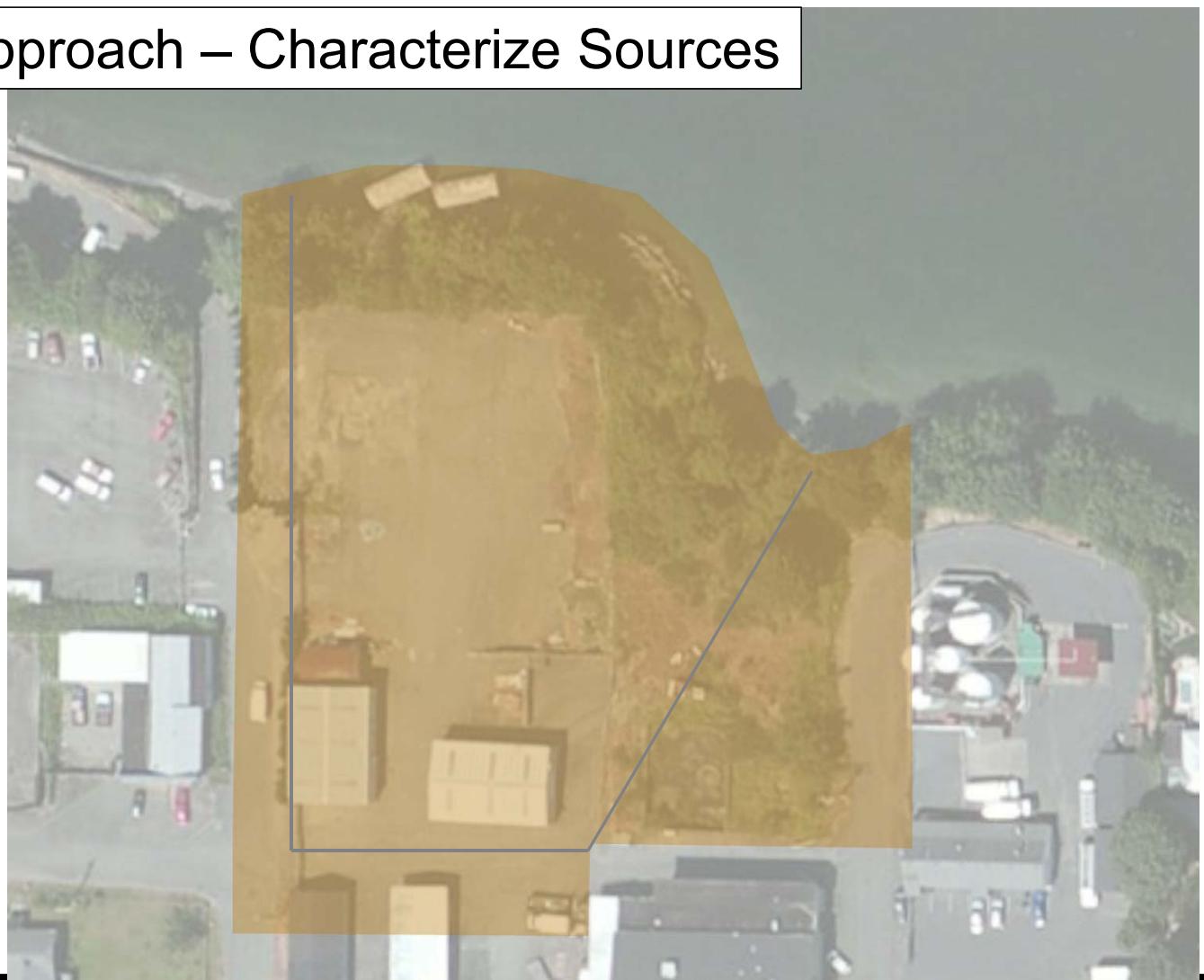
## Upland Investigation Approach – Characterize Sources

Surface explorations:

- Geophysics, utility location and survey

Source investigation:

- Trenches/cross-trenches for lateral limits
- Borings for vertical limits



## Upland Investigation Approach – Outside Source Areas

Deep investigation for hydrogeologic CSM

- Deep borings/wells for lithology, groundwater flow
- Downgradient of Source Areas: boring transects to locate monitoring wells
- Lateral limits of contamination:
  - ISM sampling and/or soil borings
  - ‘Boundary’ monitoring wells



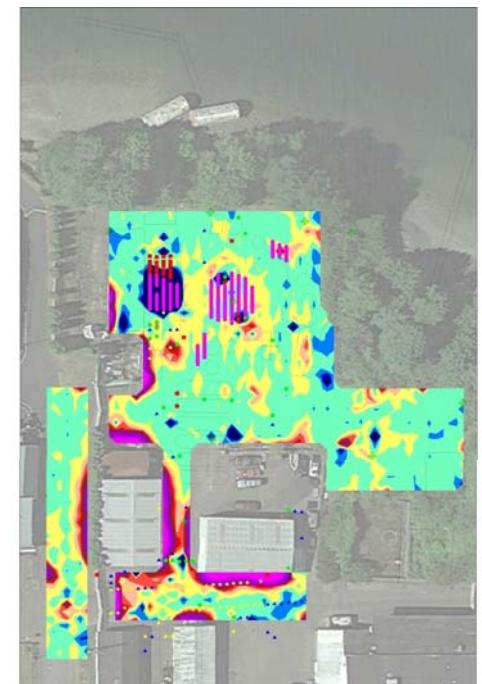
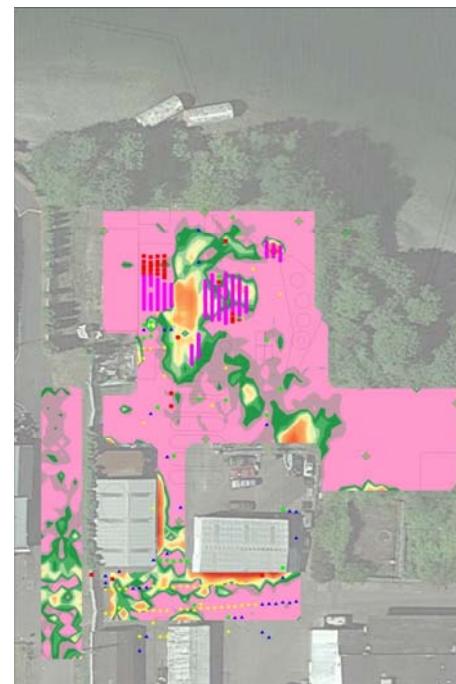
# Geophysical Survey Areas

- Ground Penetrating Radar (GPR) and Electromagnetic (EM) surveys: detect subsurface anomalies
- Electrical Resistivity (ER) survey: depth of fill in former ravine



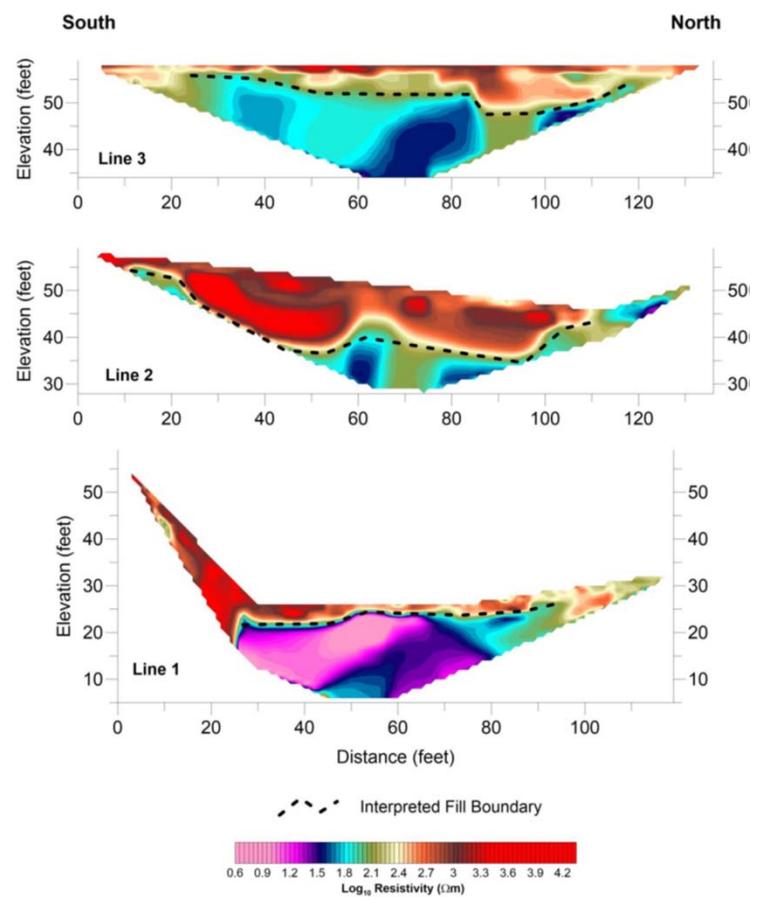
# Geophysical Surveys – GPR/EM Results

- Many anomalies consistent with utilities and former structure/tank foundation locations
- Some trench locations added or adjusted to match identified anomalies



# Geophysical Surveys – Electrical Resistivity Results

- Estimated depth of fill - up to ~15'



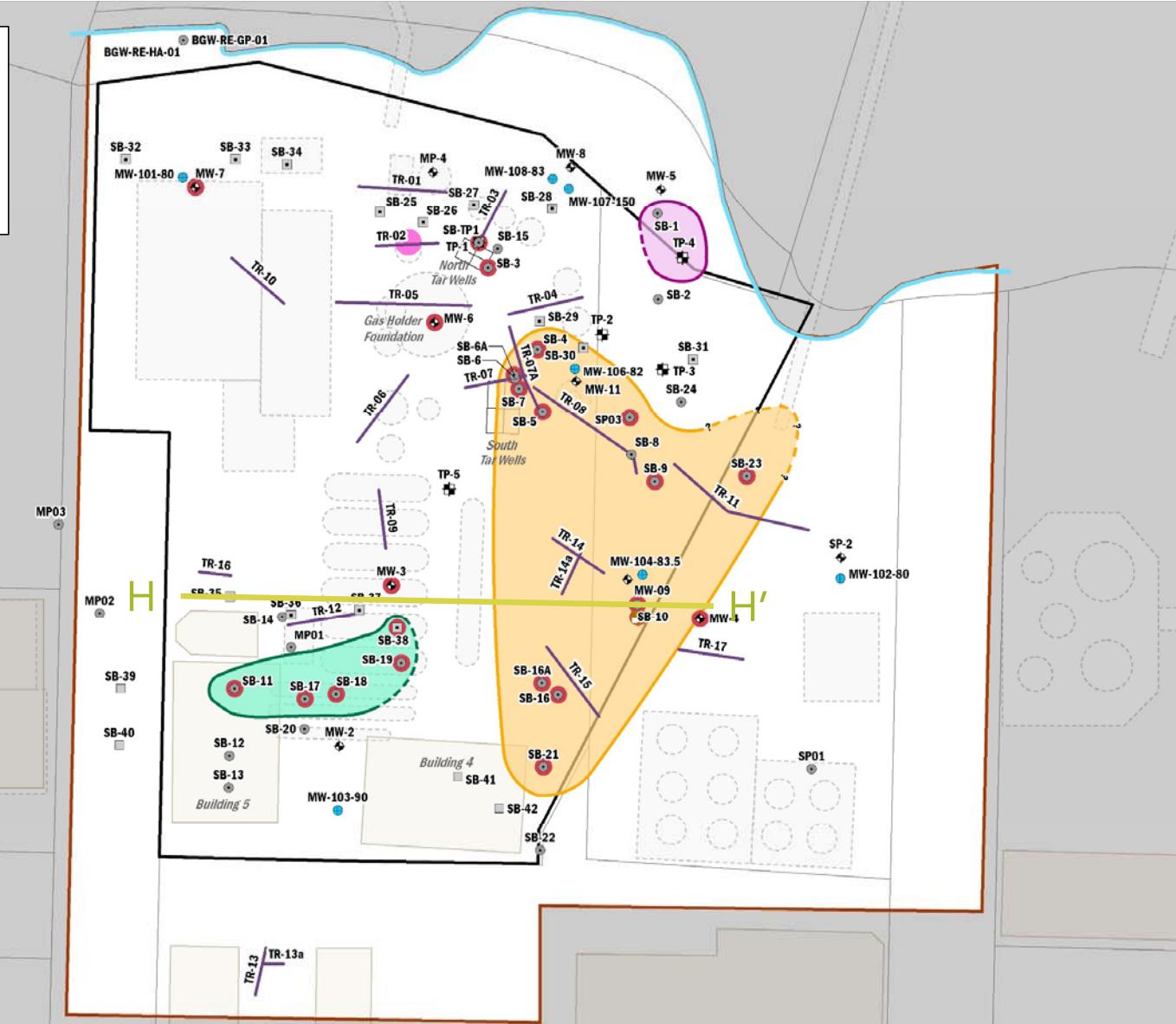
# Remedial Investigation Upland Explorations (Through Feb. 2018)

## Explorations

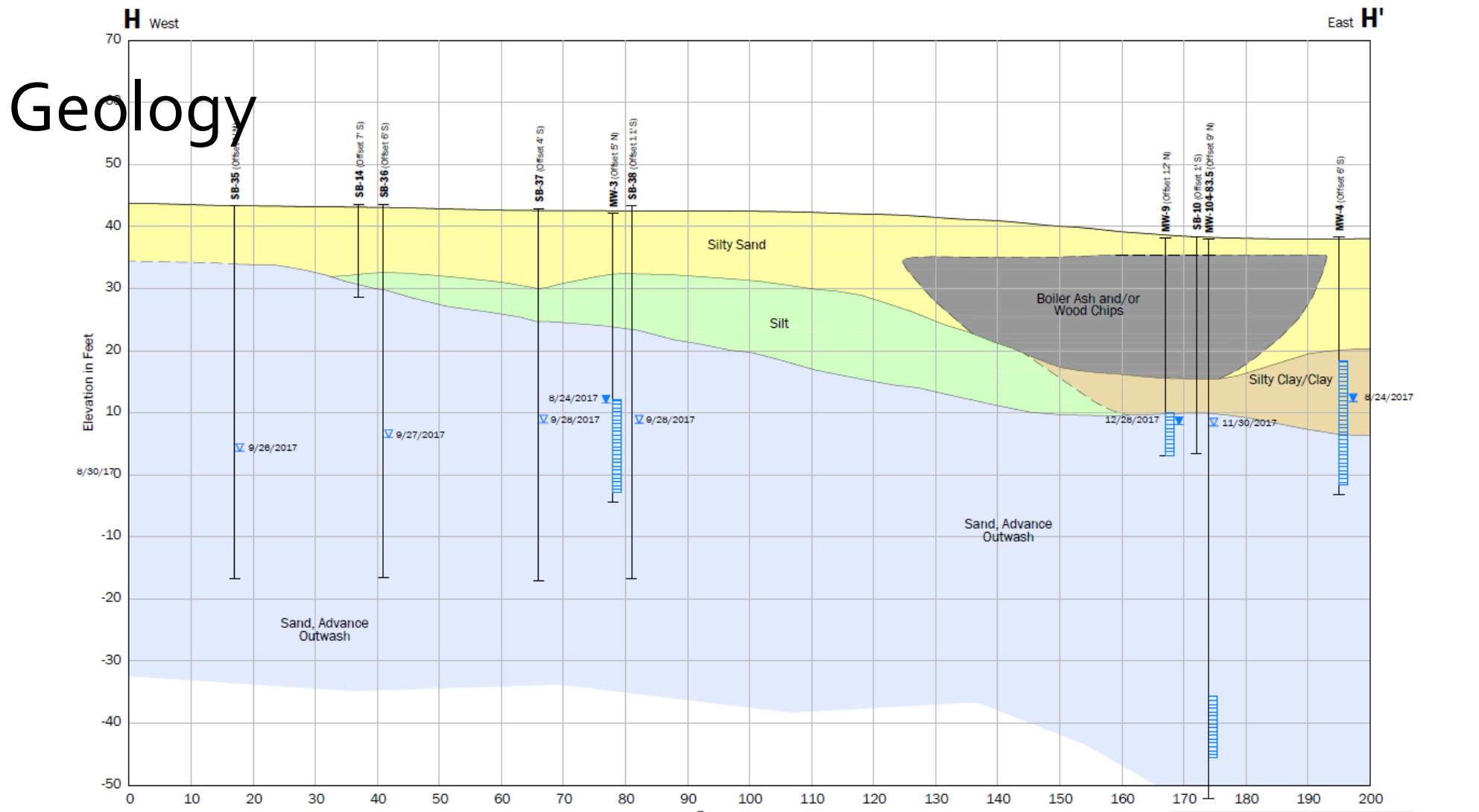
- Existing Deep Monitoring Well
- ◆ Existing Water Table Monitoring Well
- Source Investigation Boring
- Source Characterization Boring
- Soil Boring
- Test Pit
- Manhole A Test Pit
- Trench

## Generalized Areas of Potential Source Material

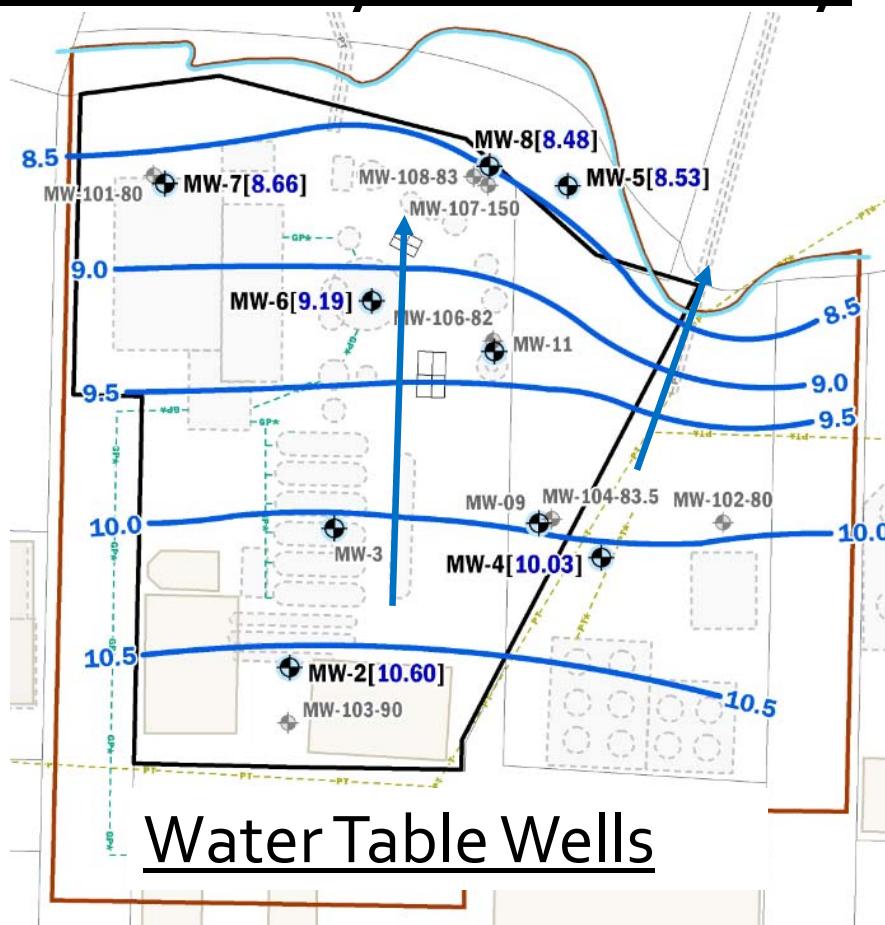
- Boiler Ash
- Boiler Ash, Woodchips, and/or NAPL
- NAPL Stringers
- NAPL Observed
- Solid Tar-Like Material Observed



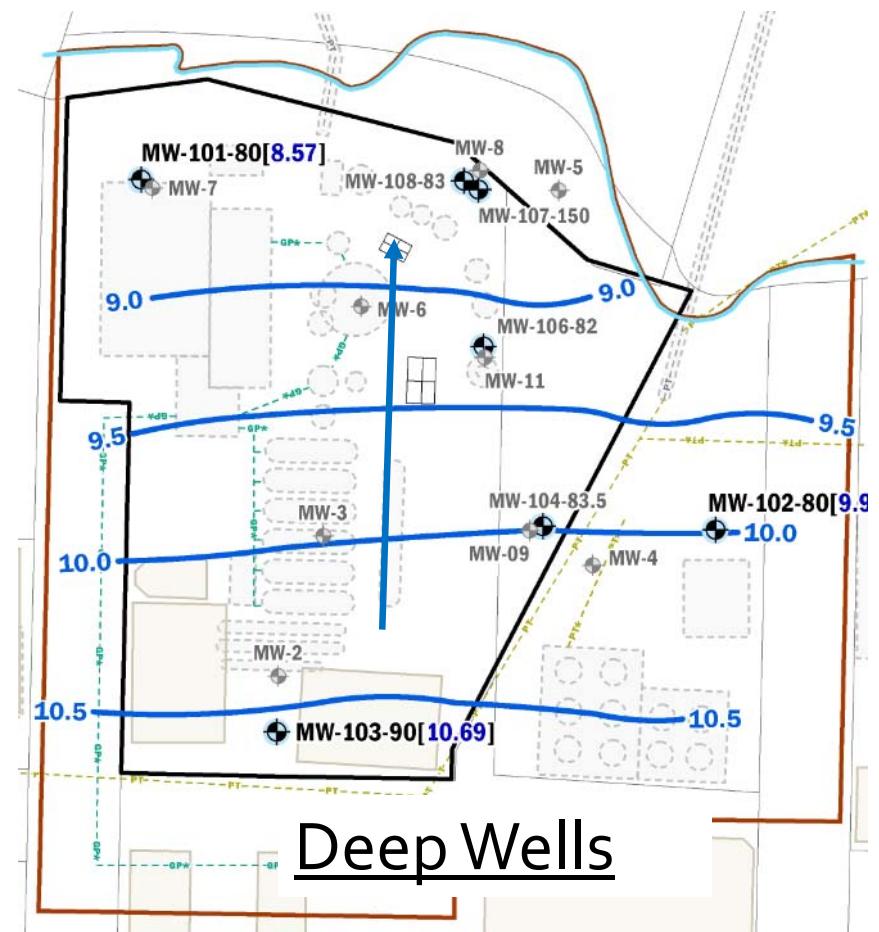
# Geology



# Preliminary Tidal Study

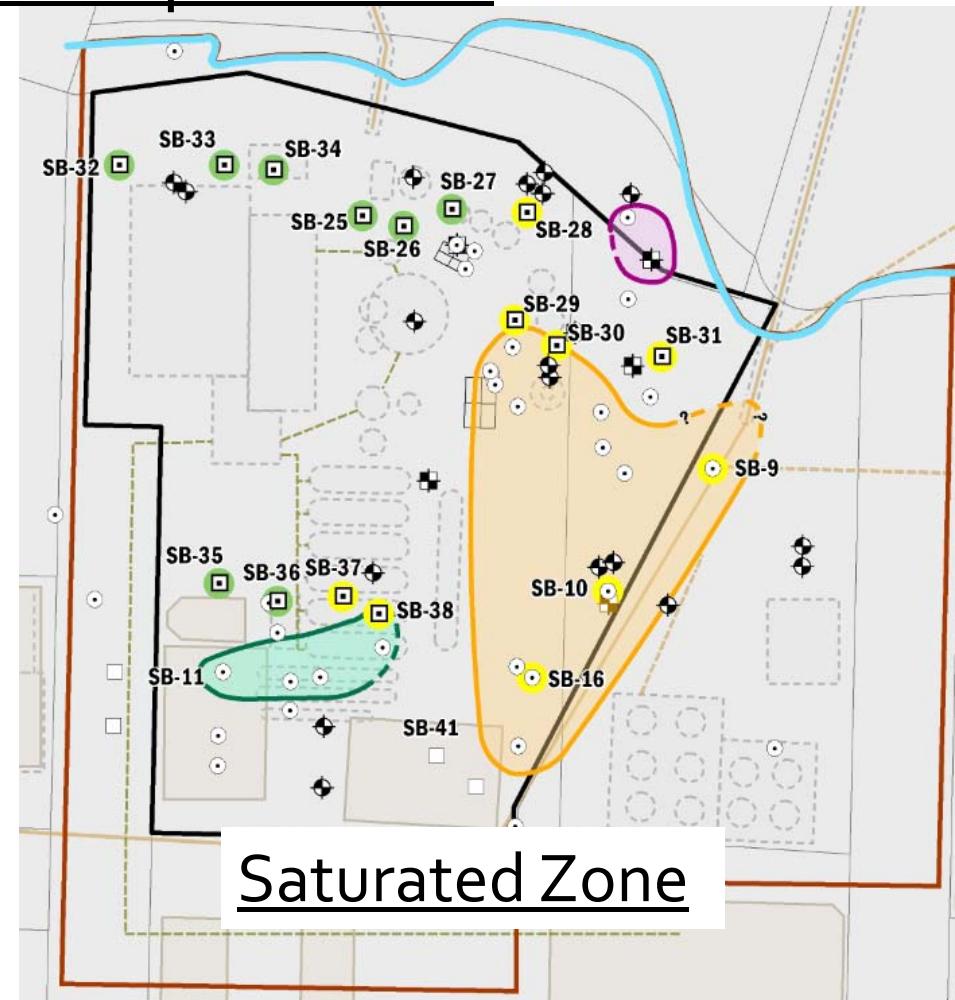
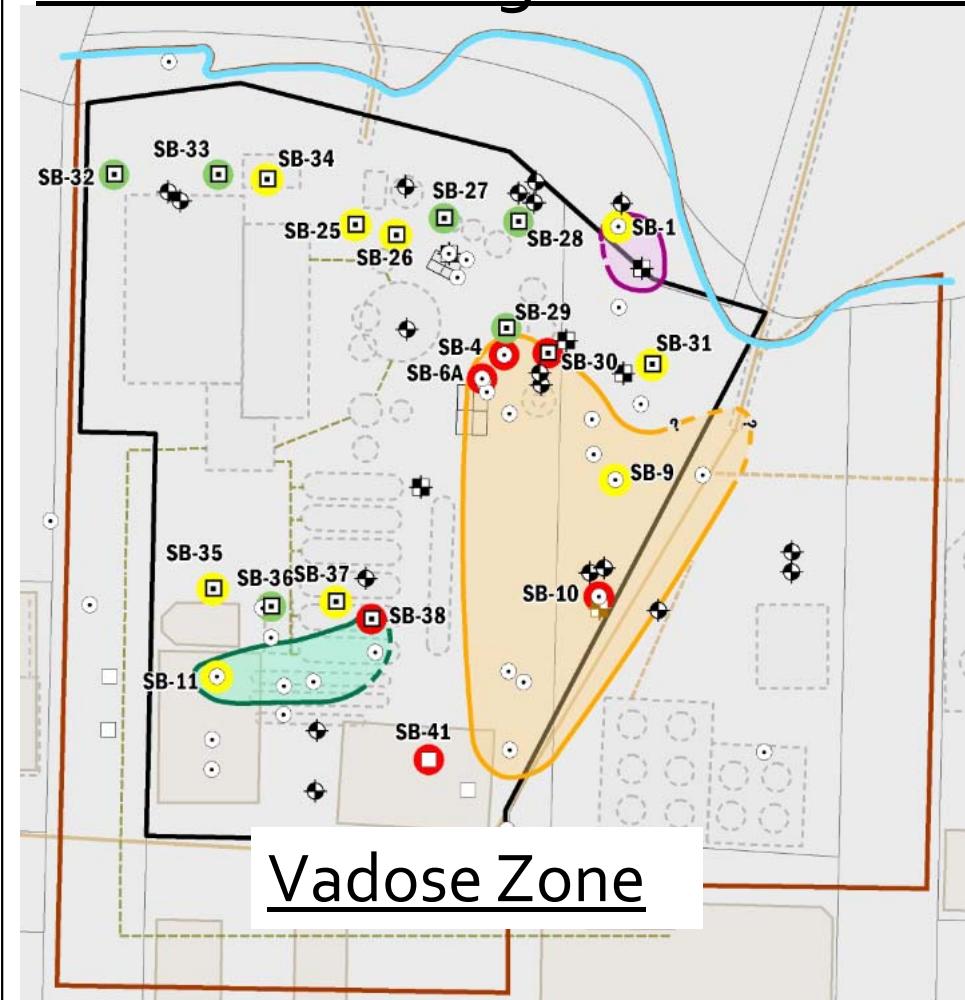


Water Table Wells

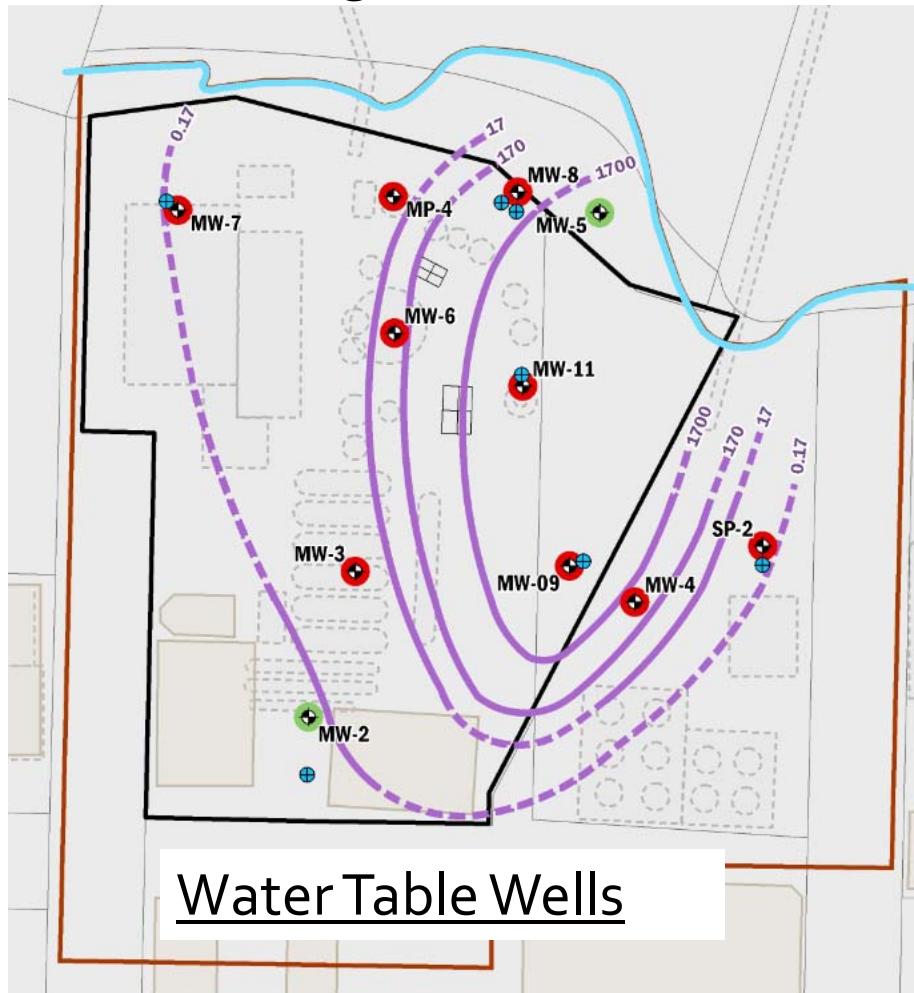


Deep Wells

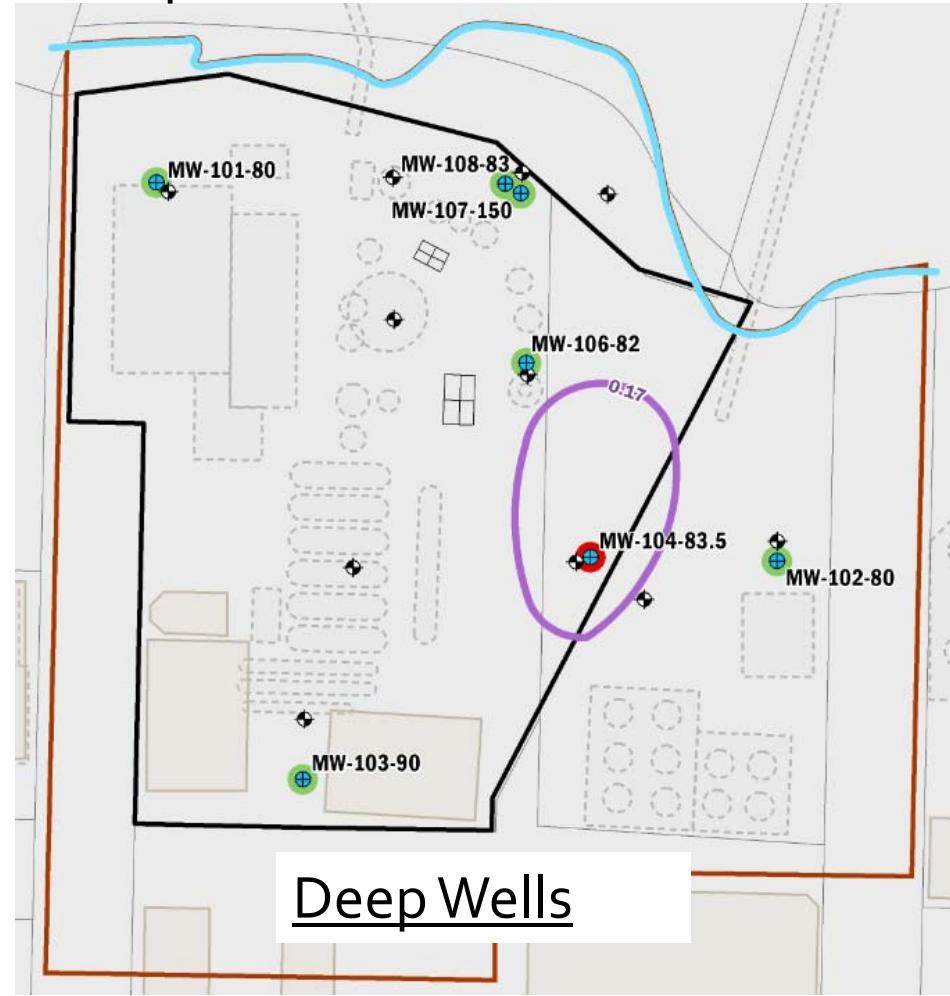
# Source Investigation Soil Data - Naphthalene



## Source Investigation Groundwater Data - Naphthalene



Water Table Wells



Deep Wells

# Key Upland RI Findings

- Source Materials Identified:
  - Boiler ash and spent purifier media (wood chips) in former ravine fill.
  - NAPL in and beneath former ravine fill – maximum depth 34 feet.
  - NAPL stringers in shallow soil in southwest corner.
- Primary constituents of concern: PAHs, BTEX and cyanide.
- Groundwater ~30 feet deep, in Advance Outwash (dense sand/silty sand).
- The Advance Outwash extends to >200 feet bgs (maximum depth explored).
- Maximum depth of soil and groundwater contamination ~90 feet.

# Upcoming Upland Work

- Determine Lateral Extent of Contamination
  - Additional monitoring wells
  - Soil sampling
- Quarterly Groundwater Monitoring
- Tidal Study and Hydraulic Conductivity Testing

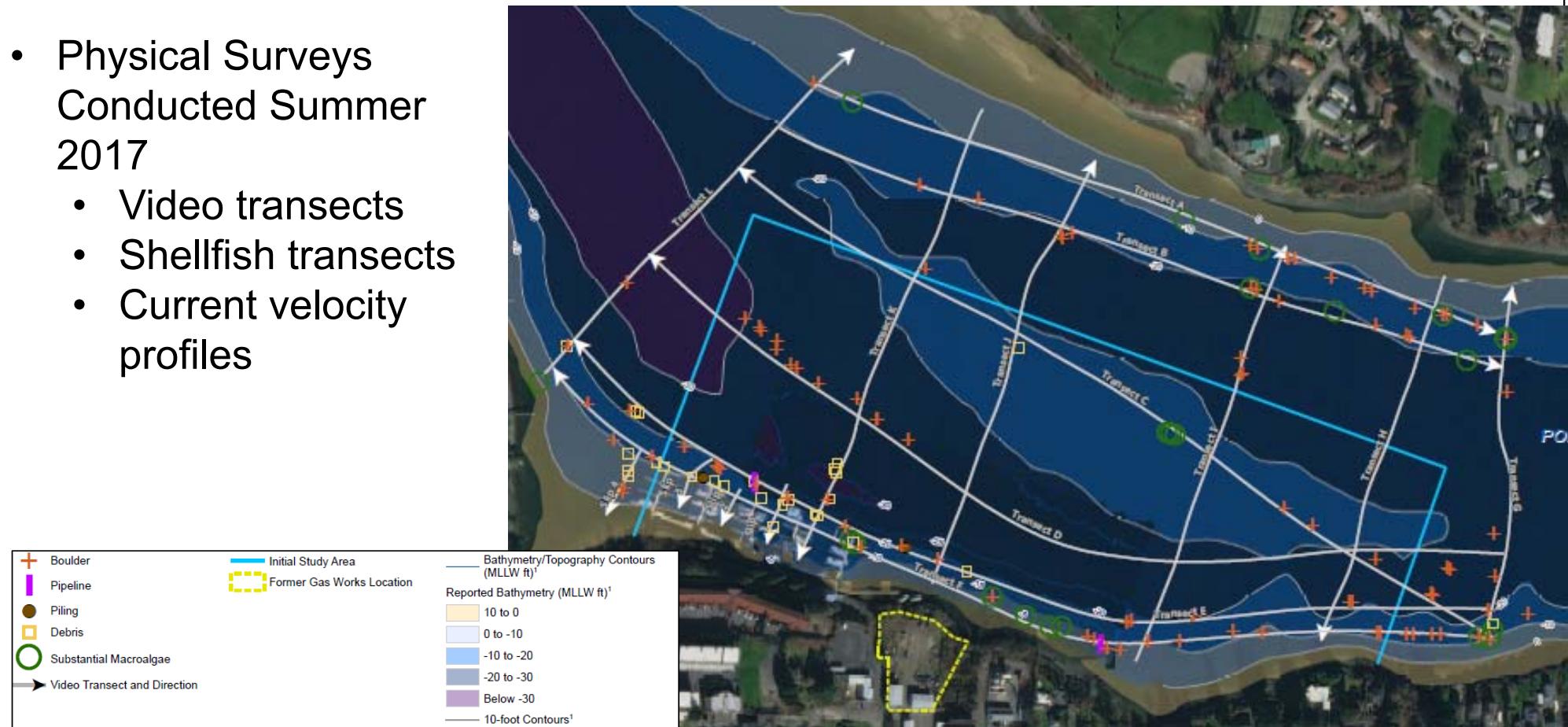
# Marine Investigation Areas

- Initial Study Area (ISA)
  - Physical, habitat, and chemical evaluations
- Port Washington Narrows (PWN)
  - Sediment physical testing to evaluate sediment transport
  - Surface water chemistry



# Marine Investigation Surveys

- Physical Surveys  
Conducted Summer  
2017
  - Video transects
  - Shellfish transects
  - Current velocity  
profiles



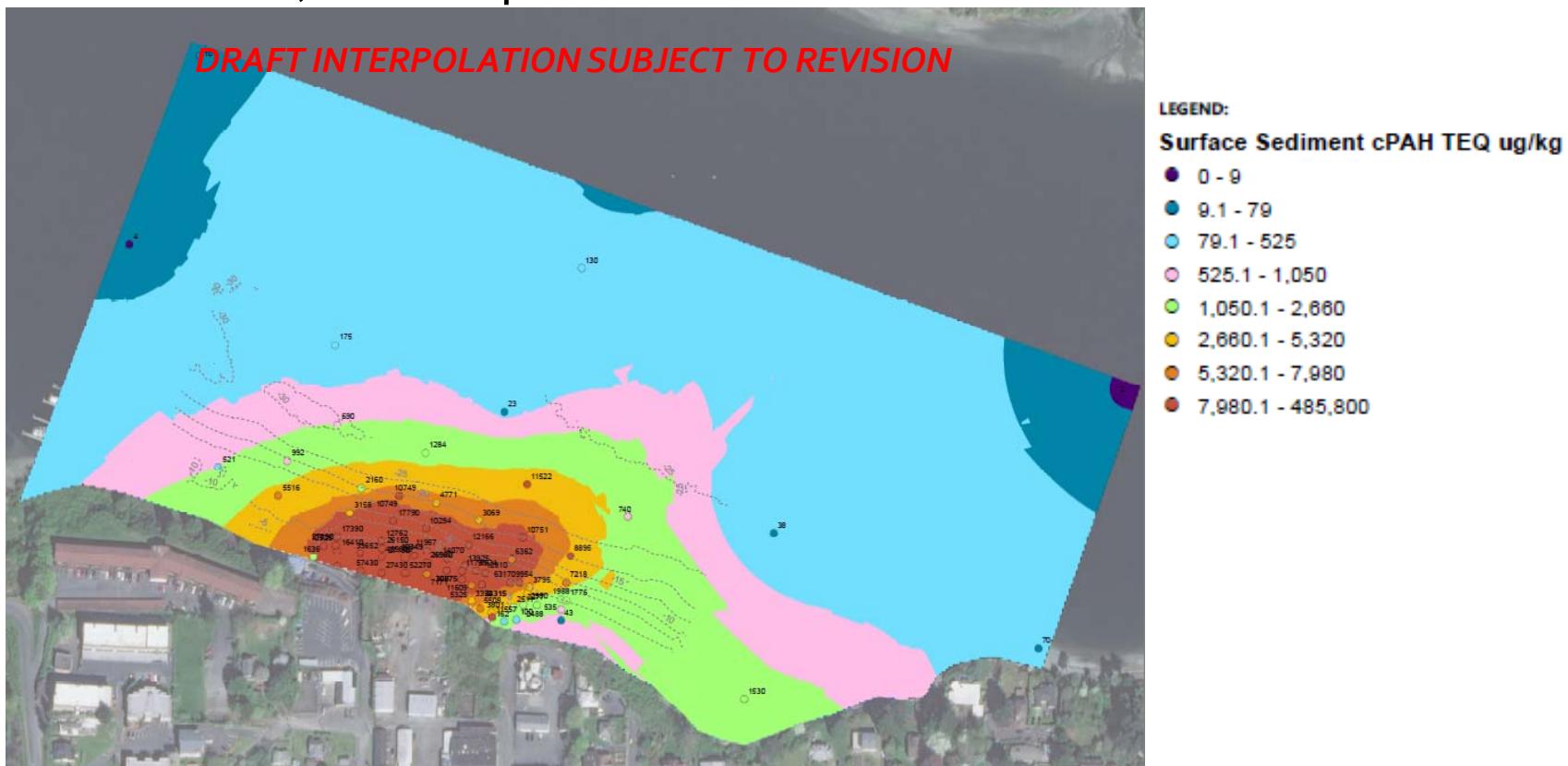
## Marine Chemical Results

- Sediment and Sampling and Analysis:
  - Conventionals in ISA and Port Washington Narrows
  - Within ISA Full Suite Testing for:
    - Metals
    - VOCs (tiered testing)
    - SVOCs
    - Pesticides
    - PCB Aroclors (tiered congener testing)
    - Pesticides
    - Dioxin/furans (tiered testing)
    - PAHs
- Surface Water in ISA and Port Washington Narrows (full suite)



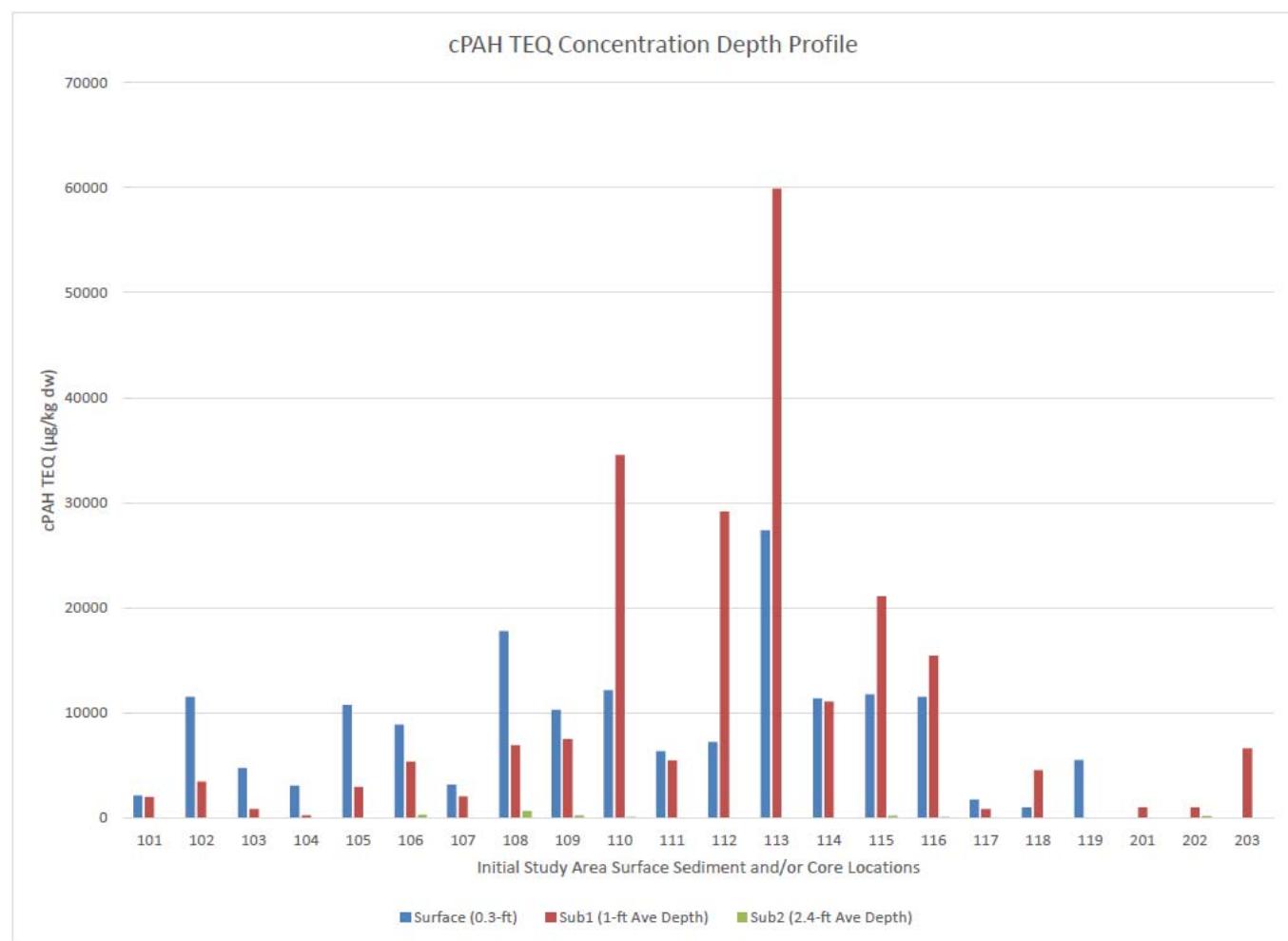
# Surface Sediment PAH Results

- Initial evaluations suggest PAHs are the most significant chemical class within the ISA, as anticipated



# Subsurface Sediment PAH Results

- Subsurface cPAH concentrations reduce rapidly with depth
- More than half of deepest core interval below natural background levels



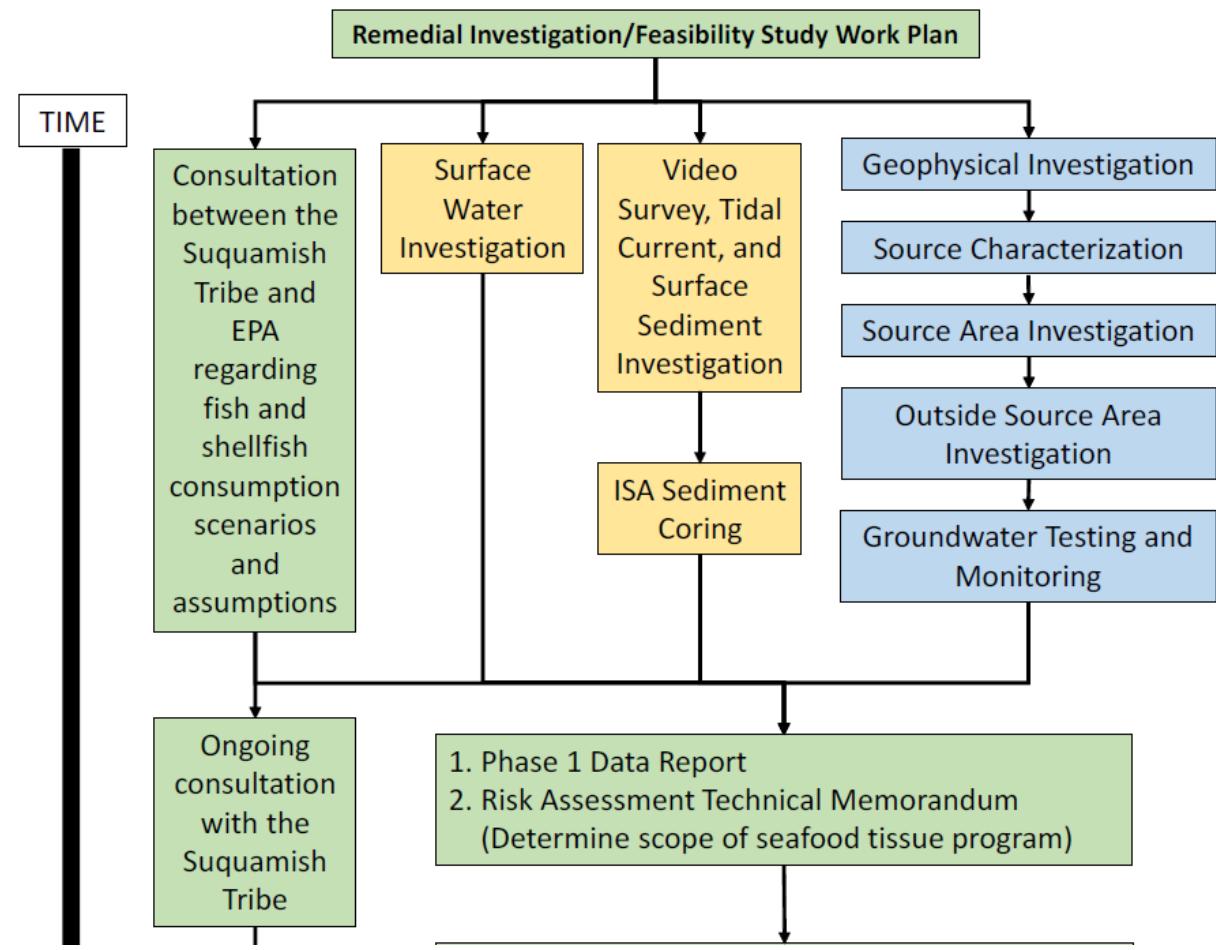
# Ongoing Characterization and Next Steps

## Ongoing Programs

- **Groundwater testing**

## Next Steps

- **Outside Source Area Soil Investigation**
- **Risk Assessment Scoping**



# Current Project Schedule

